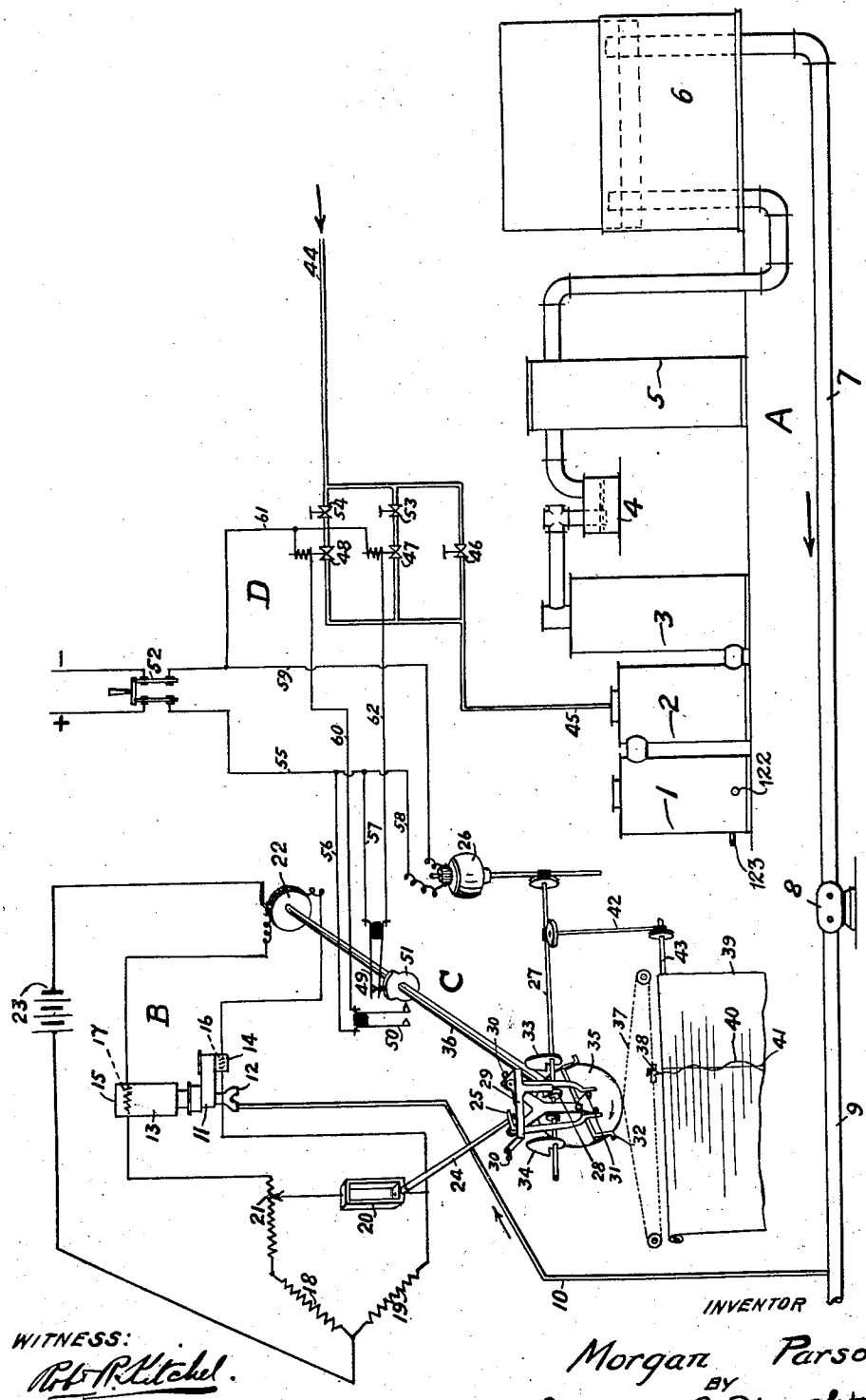
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AUTOMATIC OIL CONTROL FOR CARBURETED WATER GAS SETS

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AUTOMATIC OIL CONTROL FOR CARBURETED WATER-GAS SETS

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Objects of the present invention are to automatically produce carbureted water gas of substantially constant and predetermined calorific value and to automatically control the oil supply to the blue water gas in response to the calorific value of the carbureted water gas produced.

Other objects of the present invention will appear from the following description and the invention, generally stated, may be said to comprise a carbureted water gas set having a calorimeter adapted to measure the calorific value of the carbureted water gas produced, a galvanometer system responsive to the calorimeter and balanced at substantially predetermined calorific value of the carbureted water gas and unbalanced upon departure from that calorific value, and oil supply control means responsive to the galvanometer system.

The invention also comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and in which is illustrated more or less diagrammatically features of the invention and in those drawings

The single figure is a view partly diagrammatic and partly in elevation illustrating one embodiment of the invention.

In the drawings A generally indicates a carbureted water gas set. B generally indicates a calorimeter adapted to measure the calorific value of the carbureted water gas produced by the set A. C generally indicates a galvanometer system responsive to the calorimeter B and balanced at correct calorific value of the carbureted water gas and unbalanced, as shown upon departure from that calorific value. D generally indicates oil supply control means responsive to the galvanometer system.

In the generator 1, blue or uncarbureted water gas is made in the usual manner. 122 is an air inlet and 123 is a steam inlet, Fig. 1, for the generator 1. The gas passes to the carbureter 2 where oil is introduced to increase its heating and illuminating value. This mixture of blue water gas and oil vapor then passes to the superheater 3 where the mixture is fixed in a permanent gaseous state. The gas then passes, in order, through the wash box or seal 4, the scrubbing and condensing equipment 5, and the relief holder 6. It is drawn from the relief holder through pipe 7, by an exhauster 8, and passes through pipe 9 to a storage holder (not shown) or to the consuming apparatus (not shown).

In the drawing the sampling pipe 10 is shown tapping into the gas main beyond the exhauster. This is only illustrative of one of the many places at which the sampling pipe may be connected.

The gas sample is conducted through the pipe 10 into the mixing chamber 11 and there mixed with air admitted through the orifice 12 in the proper proportion for complete combustion. The mixture is burned in the burner 13. Air is also admitted at the opening 14, passes around the burner 13 and is discharged through the opening 15. However, in its passage around the burner it does not come in contact with the burnt sample of gas but merely absorbs the heat from it.

An electrical resistance thermometer 16 is placed at the port where the heat absorbing air enters and another like thermometer 17 is placed at a point where the heat absorbing air leaves above the burner. The difference in temperature between these two thermometers is a means for ascertaining the calorific value of the gas sample.

These two thermometers form two legs of a Wheatstone bridge, the other two legs being formed by the resistance units 18 and 19. A galvanometer 20 is connected between the thermometers and the resistances. 21 is a standardizing resistance used for balancing the galvanometer at zero. A resistance wire mounted on the cam 22 is connected in variable proportions with the thermometers 16 and 17. The battery 23 supplies power for operating the galvanometer.

Depending on the difference in temperature between the thermometers 16 and 17 the galvanometer 20 is deflected either to the right or left. As illustrated the pointer 24 is deflected to the reader's left under the arm 25. The small motor 26 runs continuously

and drives the shaft 27. On this shaft is mounted the cam 28 which periodically lifts the lifting bar 29. This bar swings on the pivots 30 and clamps the galvanometer needle under the arm 25 which is pivoted near its top. As the galvanometer needle is raised it throws the lower part of the arm to the reader's right and engages the pin 31 which is attached to the clutch bar 32. The clutch bar 32 being pivoted at its center, is tilted down at its left hand end and up at its right hand end. The cams 33 and 34 are attached to the shaft 27 and engage either end of the clutch bar which is above its central position. The clutch bar then engages with the clutch disc 35 and drives it to a new position. The clutch disc 35 and the slide wire resistance cam 22 are both fixed on the shaft 36. Therefore, when the clutch disc is moved to a new position it turns the slide wire resistance cam, changes the proportion of the slide wire resistance which is in series with thermometer 16 and thermometer 17 and tends to return the galvanometer pointer to zero where it will remain until the next change in temperature is indicated by the two thermometers. Then the operation just described will be repeated. There is also operated from the disc 35 by means of a cord 37, the writing pen 38. This records on the record paper 39 a line showing the calorific value of the gas in B. t.u. This line 40 is shown varying above and below the standard line 41. The record paper is driven by means of the motor 26 and shafts 42 and 43.

The described mechanism actuated by the galvanometer pointer has been selected from many other types of like known mechanism and happens to be a well known type of recorder the function of which is to turn an element, as the shaft 36, in one direction or the other in response to unbalanced conditions in the circuit.

A battery of valves, arranged in parallel in a manifold controls the quantity of oil admitted to the carbureter. The oil supply is shown entering the manifold at 44 and entering the carbureter at 45. A hand controlled valve 46 is set to admit to the carbureter less oil than is required to produce gas of standard calorific value. Valve 47 shown in the open position, is operated by means of an electric solenoid. This valve is open when the gas sample is of pre-determined standard calorific value and it together with valve 46 are designed to admit sufficient oil to keep the calorific value of the gas up to a desired standard. As an example of a standard calorific value reference may be made to gas of 530 British thermal units per cubic foot. Valve 48 shown in the closed position is also operated by means of an electric solenoid. This valve opens only when the calorific value of the gas falls below the desired standard. The solenoid operated valves are controlled by the finger switches 49 and 50. These in turn are operated by the cam 51 which is fixed on the shaft 36 and operated by the clutch disc 35. When the gas sample is above the normal predetermined standard the calorimeter moves the cam 51, so that both finger switches 49 and 50 are opened. This breaks the circuits from the line switch 52 and prevents current from flowing to the solenoid on valve 47 or 48. Both of these valves are therefore closed and only the minimum quantity of oil is admitted through the hand operated valve 46. This lowers the calorific value of the gas which is being made. A sample of this lower quality gas is tested by the calorimeter. After passing through the operations outlined above, the calorimeter moves the cam 51 counter clockwise and closes the finger switch 49. This energizes the solenoid of valve 47 and opens this valve. As stated above, the quantity of oil admitted to the carbureter through valves 46 and 47 should produce gas of a predetermined calorific value. However, should the quantity of gas being generated be so large that the oil admitted will not enrich it up to the pre-determined standard value, the cam 51 will be turned by the calorimeter farther in the counter clockwise direction and will close the finger switch 50. This in turn will connect the solenoid of valve 48 to the line switch 52 and open this valve. The quantity of oil being admitted to the carbureter is now above normal and should bring the calorific value of the gas again up to standard. The cycle of operations will be repeated continuously and the calorific value of the gas being sent to the consumer kept at a predetermined standard value within a small range either side of this standard. Hand operated valves 53 and 54 may be installed to regulate the flow through solenoid valves 47 and 48. More or less valves than those shown may be installed in the battery.

The circuit path from switch 52 may be traced as follows: From 55, by 56, to one side of the finger switch 50, and by 57 to one side of the finger switch 49, and by 58 to motor 26. From the other side of motor 26 the path is by 59. From the other side of finger switch 50 the path is by 60 through the solenoid of valve 48 to 61, and from the other side of finger switch 49 the path is by 62 through the solenoid of valve 47 to 61.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and in matters of mere form without departing from the spirit of the invention which is not limited to such matters or otherwise than the prior art and the appended claims may require.

I claim:

1. Automatic oil control for carbureted water gas sets including a water gas carbureter, comprising a calorimeter adapted to

measure the calorific value of the carbureted water gas produced, a galvanometer system responsive to the calorimeter and balanced at a pre-determined standard calorific value of the carbureted water gas and unbalanced upon departure from that calorific value, and oil supply control means responsive to the galvanometer system.

2. Automatic oil control for carbureted water gas sets including a water gas carbureter, comprising means responsive to the calorific value of the carbureted water gas produced, a device inoperative at a pre-determined standard calorific value of the water gas and operative upon departure from the predetermined calorific value, and an oil supply for the carbureter responsive to said device.

3. Automatic oil control for carbureted water gas sets including a water gas carbureter, comprising thermo-electric means responsive to the calorific value of the carbureted water gas, a circuit controller inoperative at a pre-determined standard calorific value of the gas and operative upon departure from that calorific value, a valved oil supply for the carbureter, and electric circuit connections and translating devices controlled by said circuit controller and adapted to control the valve of the oil supply.

4. Automatic oil control for carbureted water gas sets, including a water gas carbureter, comprising a calorific galvanometer syster, means for supplying said system with a sample of the carbureted water gas produced, valved oil supply means to the carbureter, and connections between a valve of the oil supply means and the galvanometer of said system.

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